



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005AR90B

Title: Effect of Reduced Effluent Phosphorus Concentrations at the Illinois River, Northwest Arkansas

Project Type: Research

Focus Categories: Water Quality, Sediments, Surface Water

Keywords: Water Quality, Phosphorus, Effluent Discharge, Watershed Management

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: \$14,367

Non-Federal Matching Funds: \$30,531

Congressional District: 3

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Abstract

The recent development of a total phosphorus criterion (0.037 mg TP L⁻¹ numeric water-quality standard) for Oklahoma Scenic Rivers has brought the Illinois River Basin back into sharp focus in Arkansas. However, swift action taken by several municipal wastewater treatment plants in the Illinois River Drainage Area, Northwest Arkansas, may help alleviate water-quality concerns. The most notable change came from the City of Springdale's municipal WWTP effluent discharge where historical effluent concentrations had been over 10 mg TP L⁻¹ and recent effluent concentrations have been less than 1 mg TP L⁻¹. The explanation for these phenomenal improvements is that this facility started operating using P-based management criteria in Fall 2002, with a goal of effluent concentrations consistently less than 1 mg TP L⁻¹. The question that remains is how will these reduced effluent concentrations influence baseflow P concentrations near the Arkansas and Oklahoma Stateline? [The point of potential regulation near the state border is the Illinois River, South of Siloam Springs, Arkansas (U.S. Geological Survey Station No. 07195430).] The answer to this question is the overall objective of this

proposal – the main objective will be to evaluate the spatial distribution of baseflow P concentrations from the Illinois River, South of Siloam Springs upstream several river km to the WWTP effluent discharges of the Cities of Fayetteville, Rogers and Springdale. Over 29 water-quality monitoring stations have been sampled in Spring 2002 and then again from August 2003 through October 2004. Although some distinct changes in baseflow P concentrations were observed in 2003 through 2004, baseflow concentrations ($\sim 0.100 \text{ mg L}^{-1}$) were still almost three fold greater than the TP criterion (0.037 mg L^{-1}). Because of potential transient P storage in river sediments, it may take several years for the effect of reduced effluent P concentrations to be fully observed and this proposal will sample the same 29 sites through 2005.